

What is claimed is:

1. An array device comprising

- a substrate having a surface; and,
- one or more protein immobilization regions on said surface, said protein immobilization regions each comprising:
 - (i) an ordered hydrophobic monolayer formed of alkyl chains having proximal ends which are chemisorbed or physisorbed to said surface within said immobilization regions, and opposite hydrophobic distal ends;
 - (ii) a hydrophilic monolayer attached to said ordered hydrophobic monolayer, said hydrophilic monolayer comprising a set of first hydrophilic chains, each first hydrophilic chain having a proximal end by which said first hydrophilic chain is linked to an alkyl chain distal end, and an opposite hydrophilic distal end having a functional group for covalently attaching a protein capture agent thereto;
 - (iii) one or more of said protein capture agents attached to a first subset of said set of first hydrophilic chains within said immobilization regions through a residue formed by reacting said protein capture agents with said functional groups of said first subset of said first hydrophilic chains; and,
 - (iv) one or more second hydrophilic chains each being attached to a second subset of said set of said first hydrophilic chains through said functional group or residue thereof, wherein said second subset of first hydrophilic chains and said first subset of first hydrophilic chains are mutually exclusive of each other;

wherein said first hydrophilic chains and said second hydrophilic chains are effective to resist non-specific protein binding.

2. The device of claim 1 wherein said second hydrophilic chains are polyethylene glycol chains.

3. The device of claim 2 wherein said first hydrophilic chains are oligoethylene glycol chains.
4. The device of claim 1 wherein at least two of said protein immobilization regions are adjacent each other.
5. The device of claim 1 wherein at least two of said protein immobilization regions are separated from each other by one or more border regions.
6. A method for making an array device comprising the steps of:
- a) providing a substrate having a surface; and one or more protein immobilization regions on said surface, said protein immobilization regions each comprising:
 - i. an ordered hydrophobic monolayer formed of alkyl chains having proximal ends which are chemisorbed or physisorbed to said surface within said immobilization regions, and opposite hydrophobic distal ends;
 - ii. a hydrophilic monolayer attached to said ordered hydrophobic monolayer, said hydrophilic monolayer comprising a set of first hydrophilic chains, each first hydrophilic chain having a proximal end by which said first hydrophilic chain is linked to an alkyl chain distal end, and an opposite hydrophilic distal end;
 - iii. one or more functional groups, each for covalently attaching a protein capture agent thereto and each covalently attached to one or more of said hydrophilic distal ends of said first hydrophilic chains;
 - b) reacting one or more of said protein capture agents to one or more of said functional groups attached to a first subset of said set of first hydrophilic chains within said immobilization regions to attach said one or more protein capture agents through a residue formed by said reaction of said protein capture agents with said functional groups of said first subset of said first hydrophilic chains; and,

- c) reacting one or more second hydrophilic chains with a second subset of said set of first hydrophilic chains so that one or more of said second hydrophilic chains attach through one or more residues of one or more of said second subset of said first hydrophilic chains.

7. The method of claim 6 wherein at least one of said second hydrophilic chains is polyethylene glycol.

8. The method of claim 6 wherein at least one of said first hydrophilic chains is oligoethylene glycol.

9. A method for making an array device comprising the steps of:

- a) providing a substrate having a surface; and one or more protein immobilization regions on said surface, said protein immobilization regions each comprising:
 - i. an ordered hydrophobic monolayer formed from a set of alkyl chains having proximal ends which are chemisorbed or physisorbed to said surface within said immobilization regions, and opposite hydrophobic distal ends;
 - ii. one or more functional groups for covalently attaching said protein capture agent thereto, each functional group being attached to said hydrophobic distal ends of a subset of said set of alkyl chains;
- b) reacting one or more of said protein capture agents to one or more of said functional groups attached to a first subset of said set of alkyl chains within said immobilization regions to attach said one or more protein capture agents through a residue formed by said reaction of said protein capture agents with said functional groups of said first subset of said alkyl chains; and,
- c) reacting one or more hydrophilic chains with a second subset of said set of alkyl chains so that one or more of said second hydrophilic chains attach through one or more residues of one or more of said second subset of said set of alkyl

chains, wherein said first subset of said set of alkyl chains and said second subset of said set of alkyl chains are mutually exclusive.

10. The method of claim 9 wherein at least one of said hydrophilic chains is polyethylene glycol.

11. The method of claim 9 wherein at least one of said first hydrophilic chains is oligoethylene glycol.